WE CLAIM:

1. A reflector for X-ray radiation, the reflector comprising:

   means defining a first non-circular arc shape along a first cross section, said first cross section extending in an XZ plane containing an X direction; and
   means defining a second non-circular arc shape along a second cross section, said second cross section extending in a YZ plane perpendicular to said X direction.

2. The reflector of claim 1, wherein said second arc shape of the reflector along said second cross section defines focusing properties of the reflector.

3. The reflector of claim 2, wherein said focusing properties are within said YZ plane.

4. The reflector of claim 1, wherein said first and said second arc shapes focus or render parallel in two-dimensions.

5. The reflector of claim 1, wherein said first arc shape is parabolic, hyperbolic or elliptic along said first cross-section.

6. The reflector of claim 1, further comprising a periodically repeating sequence of layers of materials A, B, ... with different refractive indices, wherein a sum $d=d_A+d_B+...$ of thicknesses d_A, d_B... of successive layers of said materials A, B,... changes continuously along said X-direction.

7. The reflector of claim 6, wherein said sum changes in monotonically.

8. The reflector of claim 7, wherein said sum changes along said second cross-section.

9. The reflector of claim 8, where said sum changes by more than 2%.

10. The reflector of claim 8, wherein a curvature of the reflector along said second cross-section compensates for a change in said sum d along said second cross-section by differing from a comparable reflector with a constant sum d and circular curvature along a respective second cross-section thereof for given focusing and reflectivity properties of the reflector.

11. The reflector of claim 1, wherein said second arc shape has an elliptical curvature of different lengths of semi-axes along said second cross-section.

12. The reflector of claim 1, wherein said second arc shape has a parabolic curvature along said second cross section.

13. The reflector of claim 1, wherein the reflector has a reflecting surface width of more than 2mm as measured perpendicular to said x-direction.

14. The reflector of claim 13, wherein said width is at least 4mm.

15. An X-ray analysis device comprising an X-ray source, an X-ray detector, optical shaping and/or delimiting means and the reflector of claim 1.

5   16. The X-ray analysis device of claim 15, wherein X-ray radiation impinges on the reflector at an angle of less than 5° with respect to said x-direction.

17. The X-ray analysis device of claim 15, wherein a curvature of the
10   reflector along said second cross-section is formed such that a reflectivity of the reflector is maximum for a wavelength of radiation generated by said X-ray source.

18. The X-ray analysis device of claim 15, wherein said reflector
15   focuses X-ray radiation impinging thereon to a focal spot.

19. The X-ray analysis device of claim 18, wherein said focal spot is on a sample or on said X-ray detector.

20   20. The X-ray analysis device of claim 15, wherein the reflector generates a reflected X-ray beam with a certain ray divergence from X-ray radiation impinging thereon.

21. The X-ray analysis device of claim 20, wherein said certain ray
25   divergence generates parallel rays.